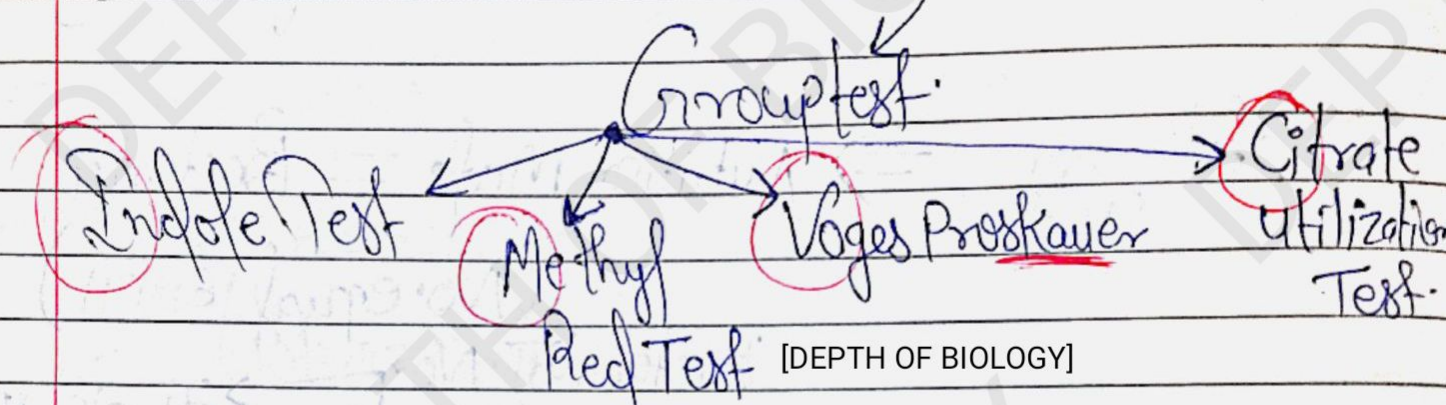


Biochemical test \Rightarrow (IMVIC Test)



\Rightarrow These test are performed to observe the presence of any bacteria that belong to the family Enterobacteriaceae.

\Rightarrow इसके परिवार के Member \Rightarrow eg = E-Coli, Salmonella typhi

These test are also used

↓
To differentiate various Member of Enterobacteriaceae family based on their Biochemical properties.

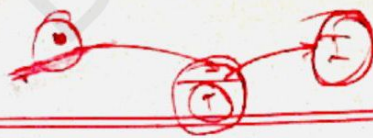
[DEPTH OF BIOLOGY]

④ Indole Production Test \Rightarrow

Objective \Rightarrow Identification of the bacteria on their ability to degrade the amino acid tryptophane.

[DEPTH OF BIOLOGY]

E.A.A

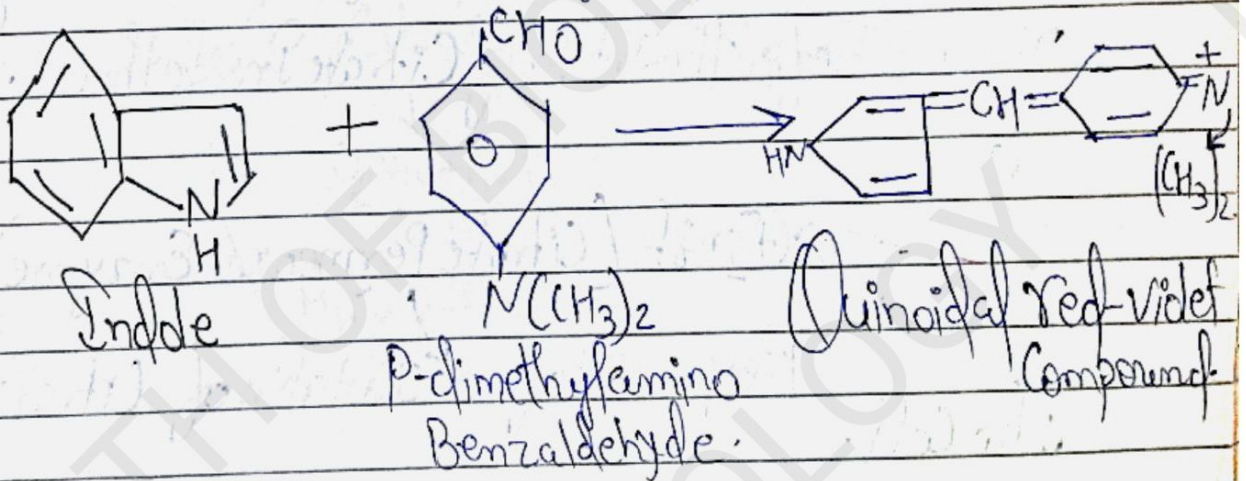


Principle \Rightarrow Tryptophan is an essential amino acid, that can be metabolized by some bacterial cell to produce Indole.

Not all bact^o have this property of conversion. [DEPTH OF BIOLOGY]

The Indole is then reacted with p-Menthyl amino benzaldehyde

Portion of Kovacs reagent. (p-dimethylamino benzaldehyde + HCl + Butanol) & form a red colour complex, due to which mediaburns red at top layer of Media. [DEPTH OF BIOLOGY]



Result \Rightarrow The appearance of red colour on the top layer of the medium indicate presence of Microorg.

Tryptophan Broth

Tryptophan

Microorg. (Ant.) then tryptophan convert into Indole

Kovacs Reagent

Red colour form



② Citrate Utilization Test ⇒

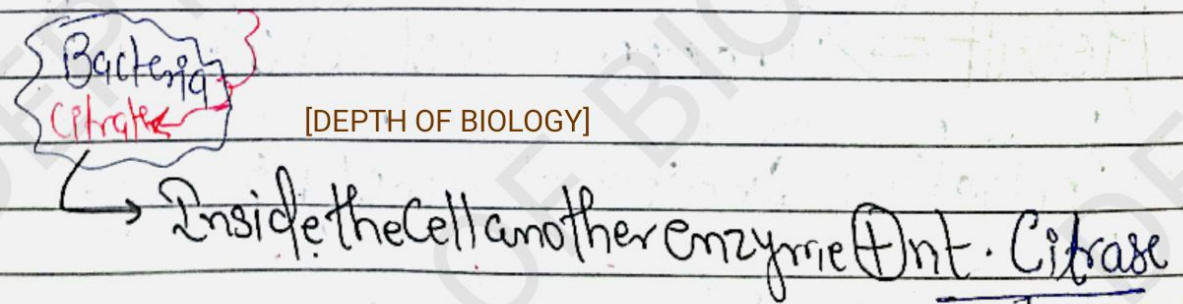
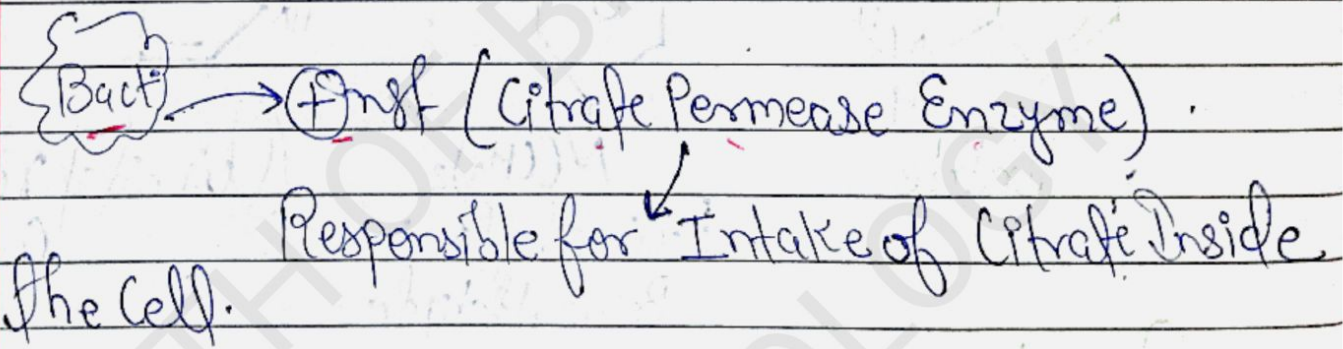
Object ⇒ Differentiate Microorg. on the basis of their ability to metabolize Citrate as sole/only source of Carbon.

Principle ⇒ [DEPTH OF BIOLOGY]

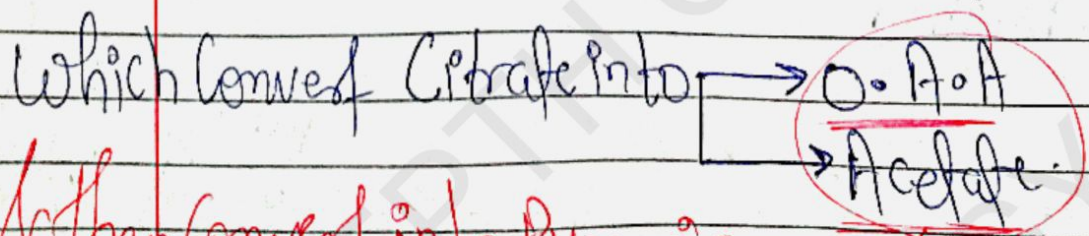
In the absence of Glucose or lactose. Some bacteria utilize Citrate as Carbon source for energy Prodⁿ.

[DEPTH OF BIOLOGY]

⇒ Citrate utilize by those bacteria (which have Citrate permease Enzyme) responsible for the Intake of Citrate Inside the cell.



[DEPTH OF BIOLOGY]

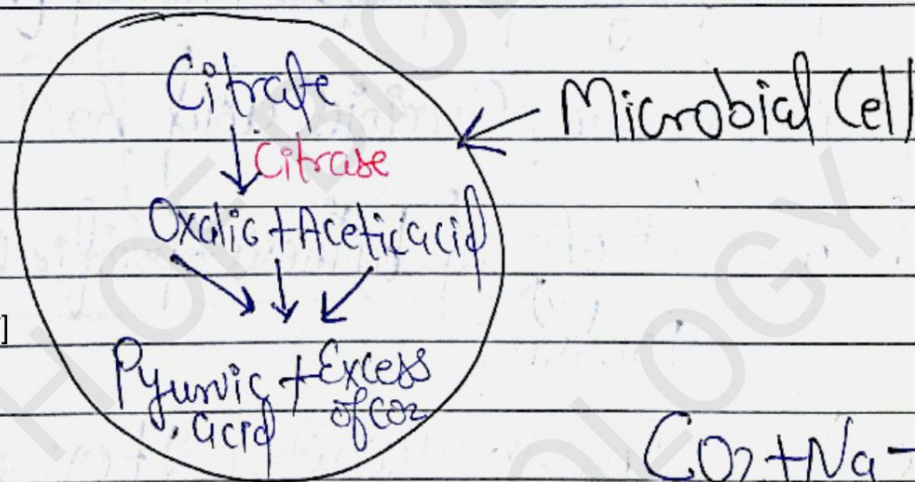


Then convert into Pyruvic acid & C.O₂

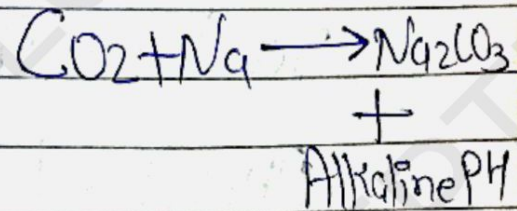
Greenrate CO_2 combines with Sodium Water to produce Na_2CO_3 (Alkaline phto).

अब इस Media में Indicator सिता है Bromothymol blue \rightarrow Now it turns from Green to Prussian Blue. (due to alkaline PH). [DEPTH OF BIOLOGY]

Result \Rightarrow Formation of Blue colour indicate (+ve) Test. (Presence of Microorganism). [DEPTH OF BIOLOGY]



[DEPTH OF BIOLOGY]



Bromothymol Blue (Green) $\xrightarrow{\text{Due to Alkaline PH}}$ Prussian Blue.

(Positive Test if colour appears)

③ Methyl Red Test \Rightarrow

Objective \Rightarrow To determine the ability of ^{organism} oxidize glucose of
& Prodⁿ of Acid products.

② To different. E Coli & Enterobacter Aerogenes.

Principle \Rightarrow

[DEPTH OF BIOLOGY]

Some specific Organism when grown on any Glucose containing Media they used to produce Mix Acid (Many Acid) Like Acetic, formic, Succinic acid,

The amount of acid by these specific Microorganism.
Produced

Reaches to that level at which it overcome the effect of Phosphate buffer added in the Glucose phosphate broth Culture Media. [DEPTH OF BIOLOGY]

• Due to prodⁿ of acid the pH of Glucose phosphate broth reaches to near of pH 4. [DEPTH OF BIOLOGY]

इस क्षति Time क्षति क्षति Indicator क्षति Methyl Red, कि Colour Medium को क्षति क्षति



At pH 4.4 or lower the colour of Methyl Red is
Remains red & remains stable for long time.

⇒ (2) case: If colour of Methyl red $\xrightarrow{\text{change}}$ Yellow
It indicates presence of bacteria (Enterobacter)

It utilize the acid & produce [DEPTH OF BIOLOGY]
Non-acidic, Neutral compo.
& take pH towards Neutral around pH = 6.

At pH = 6 the colour of Methyl Red $\xrightarrow{\text{turns}}$ Yellow.

Result ⇒ Red colour indicates presence of E-Coli.
Yellow colour indicates presence of Enterobacter aerogenes.

[DEPTH OF BIOLOGY]

Glucose Phosphate Broth.

Test for differentiation b/w E-Coli & Enterobacter aerogenes

Glucose

↓ E-Coli

Mixed Acid

(Acetic, formic, Succinic)

Glucose

[DEPTH OF BIOLOGY]

↓

Mixed acid

↓ Enterobacter aerogenes

Mixed acids overcome
the buffer effect

Non-acidic end
pdt.

pH of the phosphate buffer
become 4.4 or less

pH near 6.0

Methyl red Indicator

[DEPTH OF BIOLOGY]

Red colour

Yellow colour

[DEPTH OF BIOLOGY]

Positive test

Negative test

E-coli \oplus test
in culture

Enterobacter
aerogenes \oplus test



Voges-Proskauer Test \Rightarrow

Objective \Rightarrow To diff. E-coli & enterobacter aerogenes & klebsiella...

Principle \Rightarrow Some bacteria when inoculated in Glucose phosphate broth, they utilize glucose by Butylene glycol pathway & produce Acetyl Methyl Carbonyl (Ace) which

This acetoin react with the Indicator Barritt's reagent

[DEPTH OF BIOLOGY]

(0.6 ml of Alcoholic soln. of α -Naphthol & 0.2 ml of 40%

KOH) & form (diacetyl) & this \rightarrow react with pepton (first in

Culture media) Produce red rose colour in this Media.

[DEPTH OF BIOLOGY]

Result \Rightarrow Formation of Rose Red Colour Indicate

Presence of specific Microorg. (+ve test).

No form. of Red rose colour Indicate Absence of specific

[DEPTH OF BIOLOGY]

microorganism (-ve Test)